ESEMPIO DI PREDIZIONE E INCORRELAZIONE

CORSO DI SEGNALI PER LE TELECOMUNICAZIONI

$$x(t) = \cos(2\pi 0.01 t + \vartheta) \qquad \vartheta \quad \text{V.C. Unif.} \quad 0 - 2\pi$$

$$R_x(\tau) = \frac{1}{2}\cos(2\pi 0.01\tau)$$

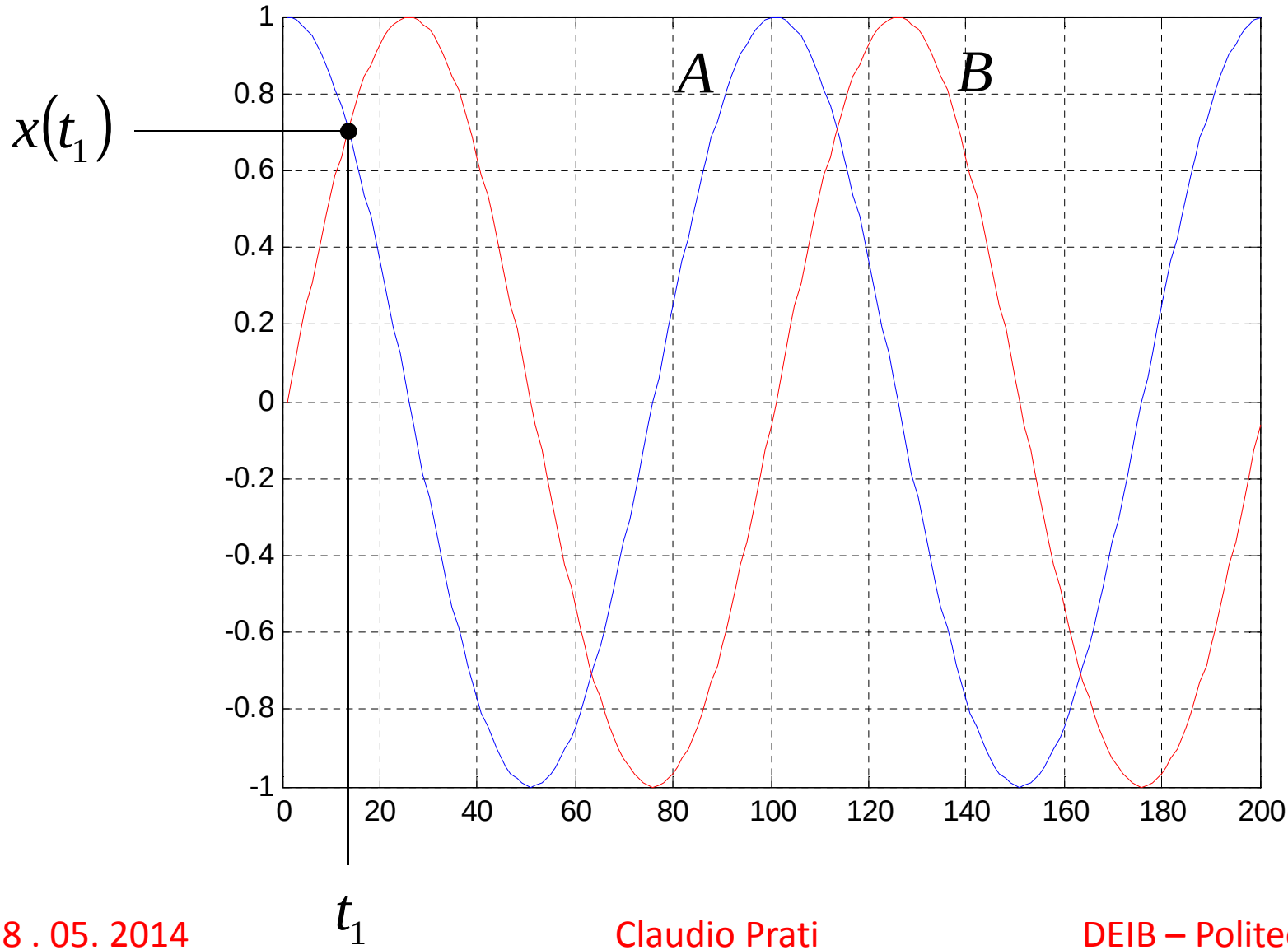
$$\rho_x(\tau) = \frac{C_x(\tau)}{\sigma_x^2} = \cos(2\pi 0.01\tau)$$

$$\rho_x(\tau) = 0 \quad \text{quando} \quad \tau = 25 + k \cdot 50$$

$$x(t) = \cos(2\pi 0.01t + \vartheta)$$

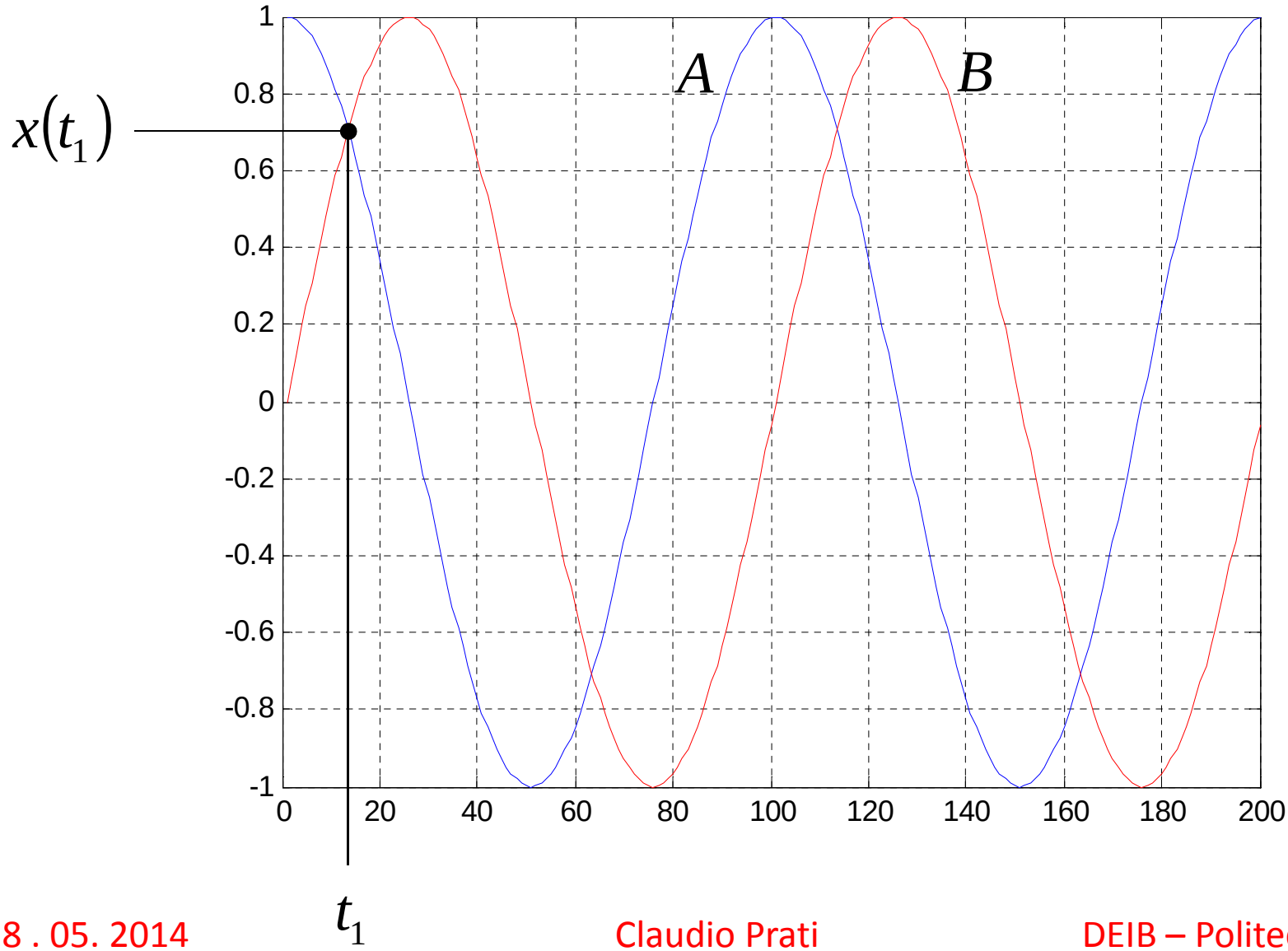
$$x(t_1) = \cos(2\pi 0.01t_1 + \phi)$$

$$\phi = \pm \text{acos}(x(t_1)) - 2\pi 0.01t_1$$

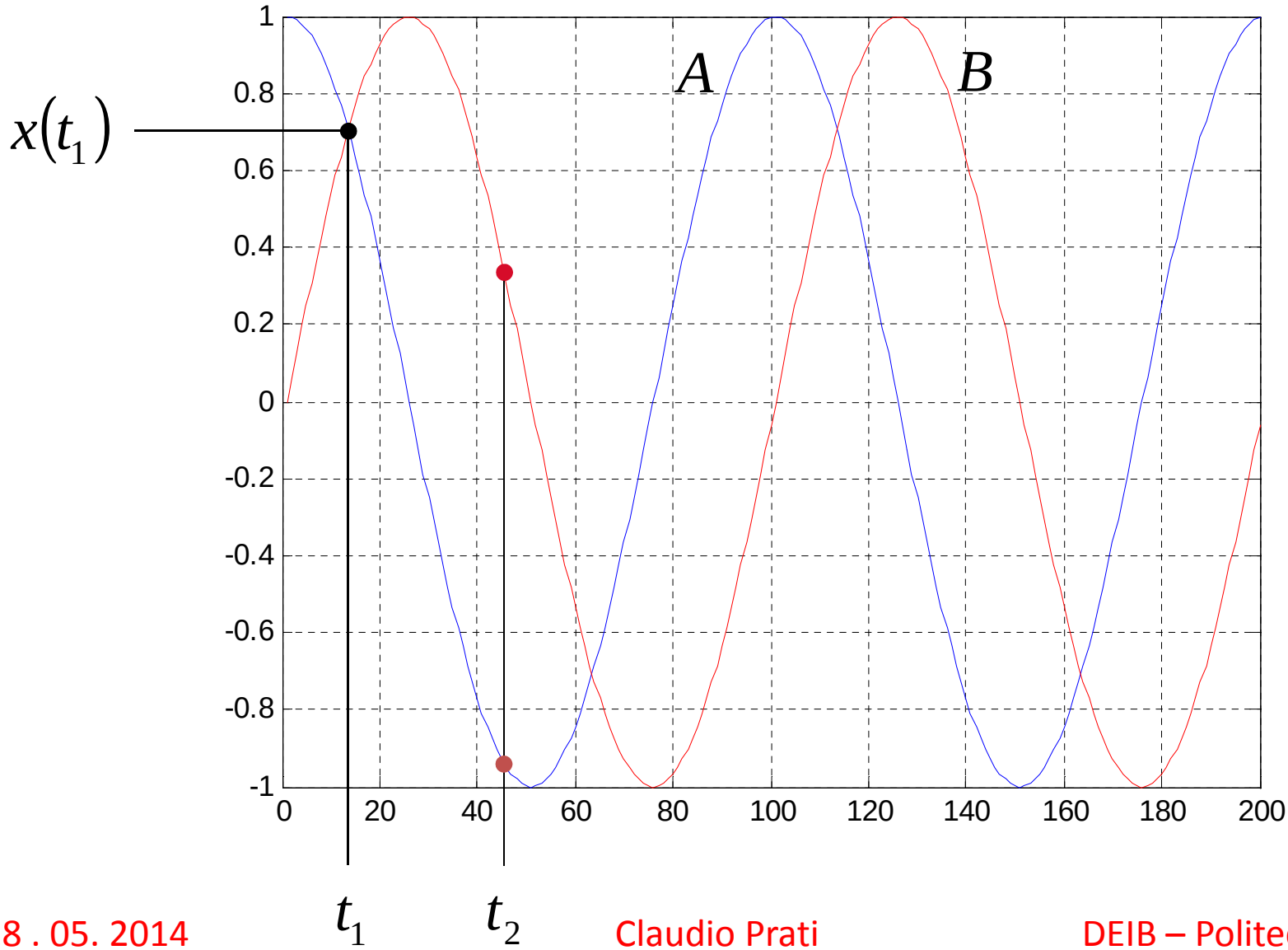


$$x_A(t) = \cos\left[2\pi 0.01(t - t_1) + \text{acos}(x(t_1))\right]$$

$$x_B(t) = \cos\left[2\pi 0.01(t - t_1) - \text{acos}(x(t_1))\right]$$



- $x_A(t_2) = \cos[2\pi 0.01(t_2 - t_1) + \text{acos}(x(t_1))]$
- $x_B(t_2) = \cos[2\pi 0.01(t_2 - t_1) - \text{acos}(x(t_1))]$



- $x_A(t_2) = \cos[2\pi 0.01(t_2 - t_1) + \text{acos}(x(t_1))]$
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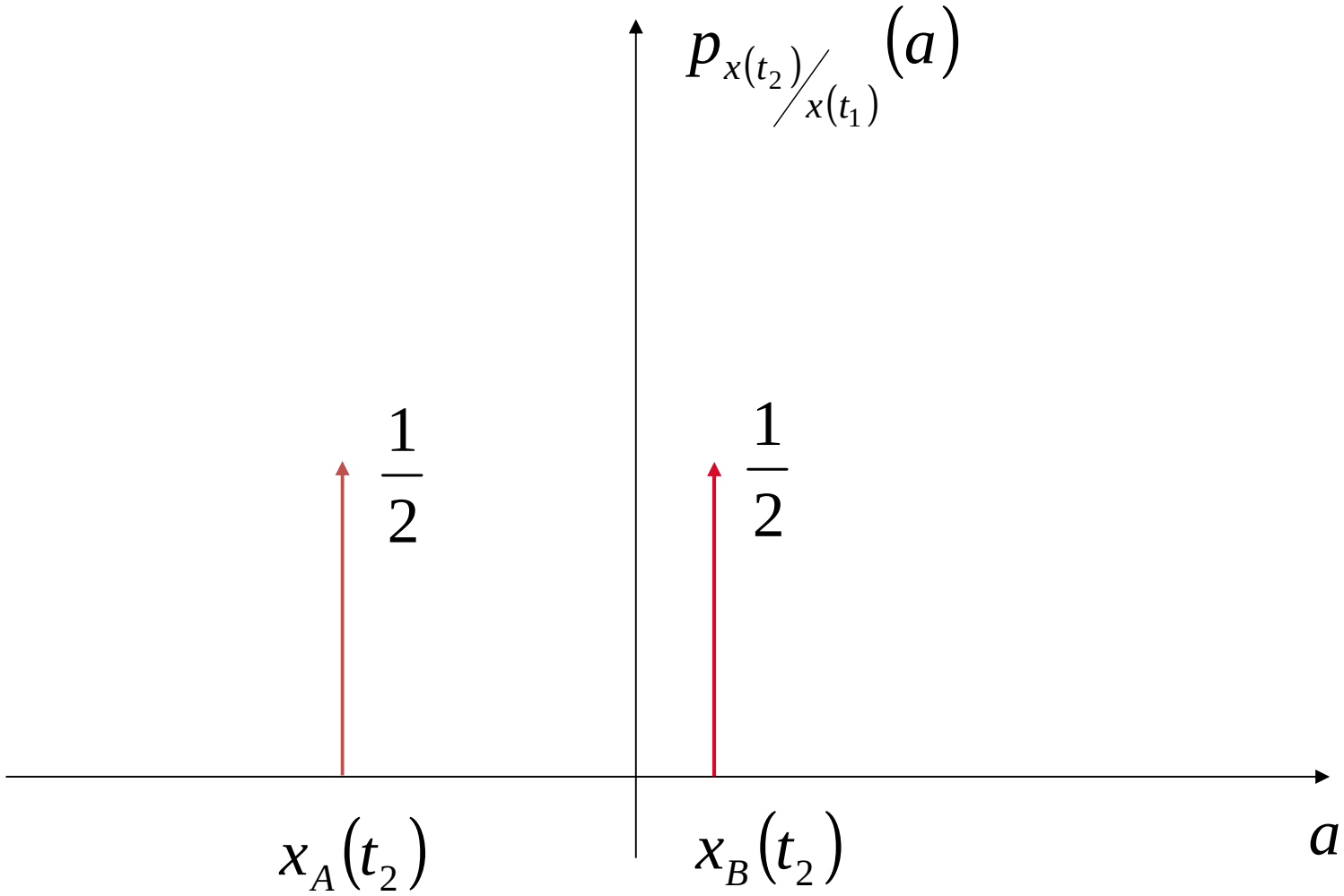
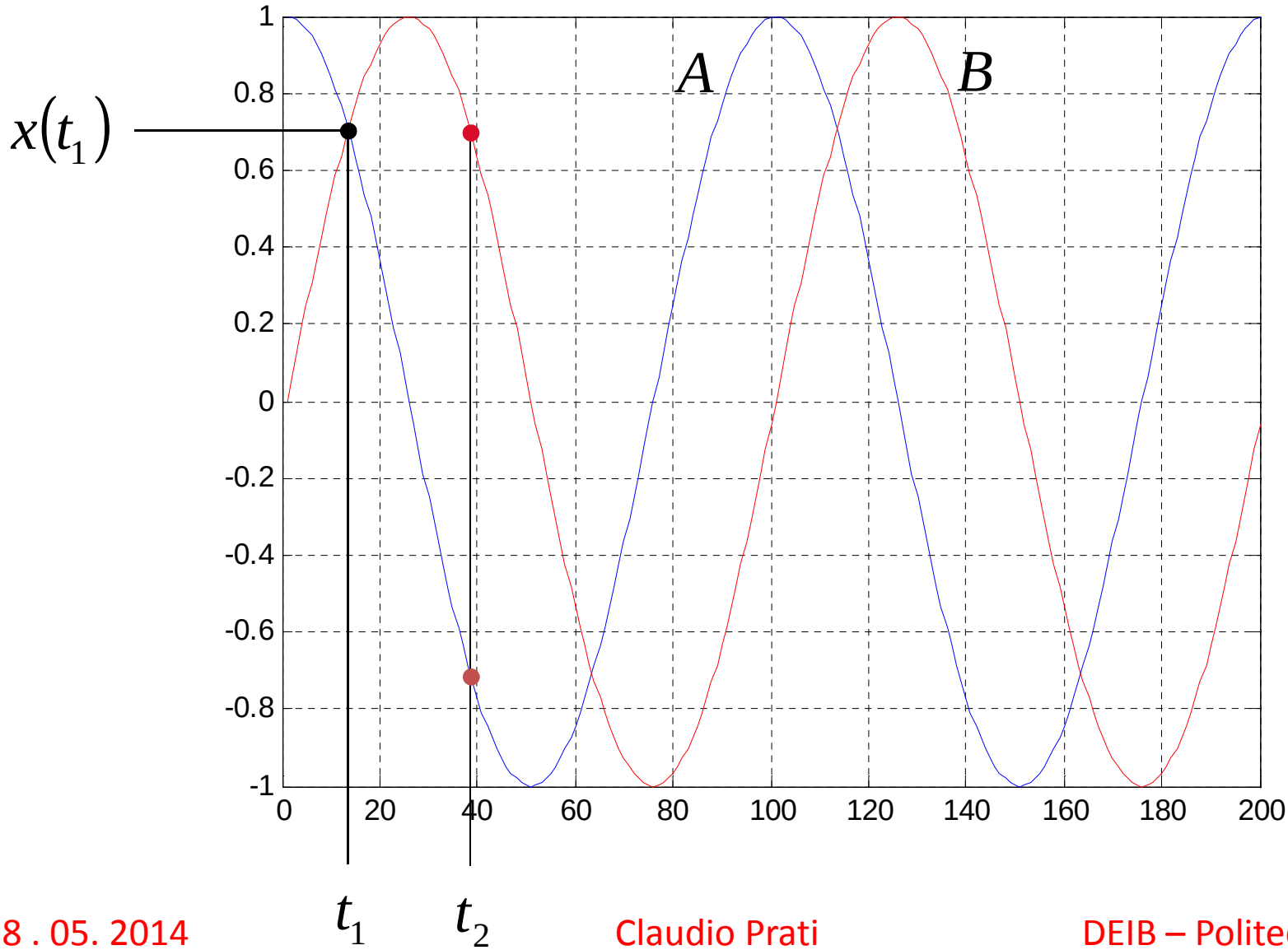


$$t_2 - t_1 = \frac{1}{4 \cdot 0.01} = 25$$

- $x_A(t_2) = \cos\left[\pi/2 + \text{acos}(x(t_1))\right]$
- $x_B(t_2) = \cos\left[\pi/2 - \text{acos}(x(t_1))\right]$



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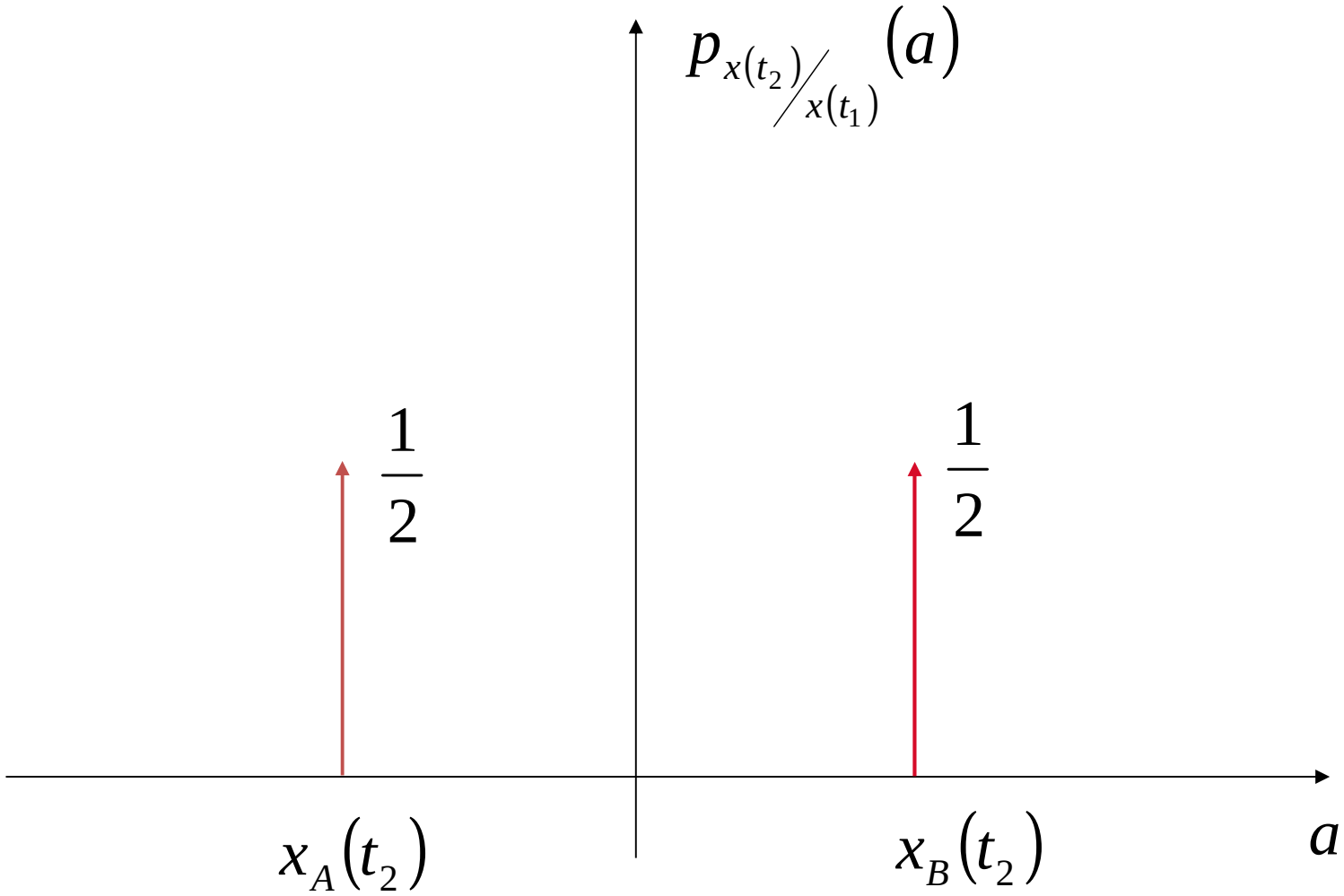

- $x_A(t_2) = \cos[2\pi 0.01(t_2 - t_1) + \text{acos}(x(t_1))]$
- $x_B(t_2) = \cos[2\pi 0.01(t_2 - t_1) - \text{acos}(x(t_1))]$

$$\hat{x}(t_2) = E\left[x(t_2) \,/\, x(t_1) \right] = \frac{x_A(t_2) + x_B(t_2)}{2} =$$

$$= \cos[2\pi 0.01(t_2 - t_1)]\cos[\text{acos}(x(t_1))] =$$

$$= \rho_x(t_2 - t_1) \cdot x(t_1)$$